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ABSTRACT

A research project in the San Luis Valley of Colorado sought to isolate a few unique farm types that could become target groups for the design and implementation of agricultural research and extension programs. Questionnaires were completed by 44 of 65 farmers in one watershed area of Conejos County. Analysis revealed a complex pattern of associations. Of the 41 farmers whose responses were used, 21 were Hispanic, 28 were full-time farmers, 18 were more than 60 years old, and 24 owned large farms (containing more than 340 irrigated acres). About half of Hispanics and 15% of Anglos were part-time farmers. Large farms were more likely to be operated by full-time farmers, by younger Hispanics, and by older Anglos. Hispanic farms grew fewer crop species, tended to be particularly dependent on alfalfa, and held virtually all sheep in the area. Younger farmers and full-time farmers were more likely to borrow money. Farm size was the most important influence on short-term management objectives. Differences between Hispanic and Anglo farmers have implications for extension educators and agricultural policymakers. An appendix explains the interpretation of statistical confidence statements. (SV)

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Colorado State University

DIFFERENCES AND COMMONALITIES

Farmer Stratifications in the San Luis Valley Research/Extension Project Area

by
Jerry B. Eckert

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Department of Agricultural
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DIFFERENCES AND COMMONALITIES

Farmer Stratifications in the San Luis Valley Research/Extension Project Area

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DIFFERENCES AND COMMONALITIES

Farmer Stratifications in the San Luis Valley Research/Extension Project Area

Purpose of the Study

Other researchers have found it useful to disaggregate San Luis Valley farmers into subgroups for analysis. Rauch (1979) looked at "small farms", defined as having gross sales of less than $25,000 in 1977. Looking at this sample over the entire valley (five counties), he identified three farm subgroups: full-time, part-time and retired. In Conejos county these three groups constituted 38%, 54% and 8%, respectively, of the small farm population.

Of interest to the present study, Rauch found that whereas Hispanics constituted only 15 percent of the farmer population of Conejos county, they accounted for 63.5 percent of the small farms as he had defined them. Thus Hispanics bulk disproportionately large among the limited income farms in the county. An identical pattern was found in neighboring Costilla county.

Skaggs (1985) conducted an analysis of farmers in the SLVREP project area. Her research developed a series of farm budgets for each of three hypothetical farm classes, which she labeled: 1) limited resources farms, 2) flexible resource farms and 3) specialized resource farms.

The present study began with the expectation that 2-4 clearly defined groups would emerge that could then form the clients for agricultural research and policy change. The thought was that if distinct farm groups could be identified, then technologies could be hand fitted to their specific circumstances. Adoption and rapid spread of technical improvements or institutional change should be enhanced if this were possible.

Background to the Study

In 1983, Colorado State University and the Cooperative Extension Service began the San Luis Valley Research/Extension Project (SLVREP), targeted at

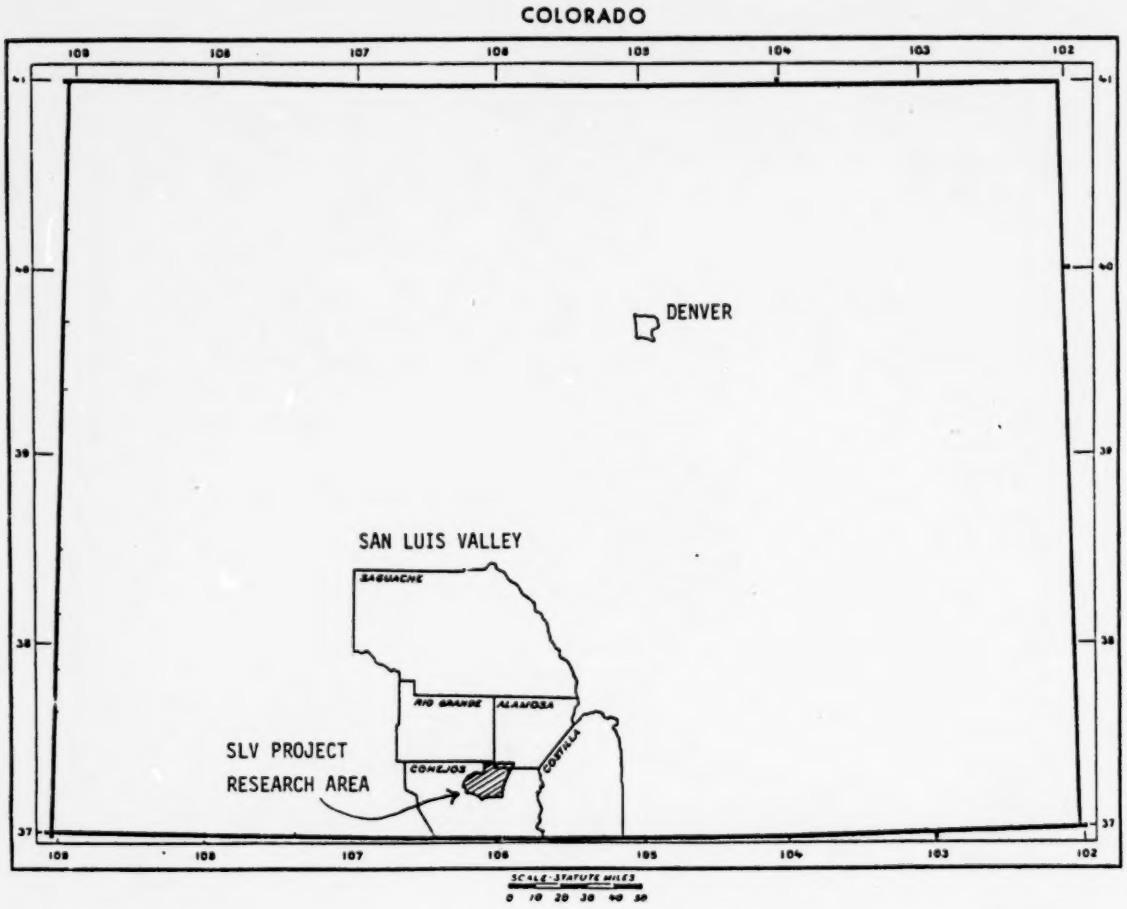
agricultural improvement in the south-west corner of the San Luis Valley. It was recognized at the time that agriculture in the southern end of the valley differed significantly from that further north. A relatively high proportion of farmers in the project area are Hispanic. Farms are generally smaller and less well capitalized. High technology agriculture is less frequently practiced than it is further north. Irrigation is almost entirely from surface flow systems rather than sprinklers. Water rights can be meager and uncertain, depending more on snowpack and runoff than on groundwater. Use of the services of private sector and government institutions is comparatively more limited than that by farms further north in the valley.

As the project evolved, it became clear that irrigation and water management would be an important focus of the research effort. Among the problem areas identified was management of irrigation water supplies, a topic which focuses attention on groups of farmers that share a common water resource. As the project evolved a second need arose. It was felt necessary to concentrate on a research area composed of relatively homogenous farms with a fairly common set of problems, so that the project could efficiently focus its efforts, producing results that would be widely applicable.

A research area was selected that approximated the area irrigated by the Alamosa River and La Jara Creek (see Figure 1). Nearly all the farms in this region use surface-flow irrigation from one or both of these two sources.

Once the research area had been defined, work proceeded on several different research topics. The impression gained by the graduate student field team during field research was that, despite efforts to limit variation within the research area, significant differentials remained between individual farms and farmers associated with the project. This paper looks at that hypothesis in a systematic way and provides an analysis of differentials where they exist. It also identifies common elements affecting all clients.

Figure 1. Research Area of the SLV Research/Extension Project



Methods

In January, 1987, the project field team surveyed farmers in the research area. The questionnaire reflected many of the insights and initial impressions gained during the previous three summer seasons of research. A set of informal hypotheses had developed and the survey sought to confirm or refute them (Hatami, et al., 1984).

From land ownership maps, there were known to be 65-70 farm families in the research area. The graduate student field team, serving as enumerators, knocked on the door of every farm household seeking a complete census. Several families were not at home when the team visited. Thus 50 families were contacted; completed questionnaires numbered 44. The composition of those not interviewed resulted largely from an "accident of timing", not from any systematic bias due to the sampling procedure. Academic constraints (the beginning of the Spring semester) preempted returning for a second try with those missed on the first pass.

The 1987 SLVREP field team was interdisciplinary (agricultural engineering, agronomy, civil engineering, sociology). To enhance objectivity, farmer interviews were conducted by two-person, two-discipline teams. Responses were reviewed each evening in a four-discipline discussion session.

Thus, the responses tabulated below represent the best that the field team could do in a very limited time period. The team acknowledges, with thanks, the forthrightness with which most respondents contributed to this effort.

After the interviews, a statistical screening process was utilized to eliminate atypical farms. As a result, three very large farms were eliminated. The resulting sample of forty-one, and the analysis based on it, can be said to refer to "typical" farmers in the research area.

Stratifications

Ethnicity: Previous work by the project in the Valley had led to the hypothesis that farms operated by farmers of Hispanic descent differed in some respects from those operated by non-Hispanics, designated "Anglos" in this report. Accordingly, the first level of disaggregation was along ethnic lines.

The final sample contained 21 Hispanic, identified by a Spanish surname, and 20 Anglo farmers.

Full-time/Part-time: Both economic theory and on-site observations suggest that part-time farmers follow different management criteria and operational modes than do full-time farmers. The second level of stratification then was based on whether farmers identified themselves as full- or part-time farmers. The Hispanic subsample was nearly equally split between 12 full-time and 10 part-time farmers. By contrast, 85 percent (17 of 20) Anglo farmers identified themselves as full-time farmers. Thus the Anglo part-time farmer subsample is too small for meaningful statistical analysis in most cases. The difference in the distribution of full- and part-time farmers between the two ethnic groups is statistically significant at the 99.9 percent confidence level.[1] For approximately half (45%) of the sampled Hispanic producers, farming is considered a part-time activity while nearly all of the Anglo farmers considered it a full-time job.

Because of this factor, and the very small number of part-time, Anglo farmers, statistical analyses exploring ethnic differences, if any, were confined to comparisons between farmers classifying themselves as full-time farmers.

Farm Size: A third stratification was performed by farm size. Total acreage, however, proved to be an unsatisfactory measure. The number of dryland acres farmed varies widely and unsystematically and this variation also affected figures on total acreage. Irrigated acreage was, therefore, chosen as a more useful stratification variable.

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[1]For a layman's discussion of the interpretation of statistical confidence statements and hypothesis testing, see the Appendix.

Among the sample of typical farmers, the number of irrigated acres farmed ranged from 15 to 800 with no large breaks in the distribution. Three hundred forty irrigated acres proved a convenient, although arbitrary, boundary with which to distinguish small vs. large farms. In the southwestern part of the San Luis Valley, farms below this level are likely to be part-time farmers. Farms with more than 340 irrigated acres are very likely to be full-time operators as the tabulation below shows.

	Irrigated Acres	
	< 340	> 340
Full-time Hispanic	4	7
Part-time Hispanic	8	2
Full-time Anglo	3	14
Part-time Anglo	2	1
All Full-time	7	21
All Part-time	10	3

Thus, 340 irrigated acres is used in this paper as the threshold between large and small farms. It must be recognized that the full-time/part-time distinction is closely associated with farm size. Differences calculated between these groups will normally reflect the influence of both factors. Unfortunately, the sample size was not large enough to permit more advanced statistical techniques that might have better separated these influences.

Age: Social theory includes the idea that households go through a "life cycle" of formation, resource accumulation, consolidation, maturity, disintegration and decline. This concept has recently been effectively applied to explain the dynamics and structure of agricultural communities in developing countries. The most frequently used variable for this type of research is the age of the household head, which serves as a proxy for the length of time that the household has existed. To explore this dimension in the SLVREP research

area, farmers were classified by age. Two arbitrary classes were used: below 60 and 60 or above. The sample was distributed as follows:

	<60	≥60
Hispanic	11	10
Anglo	12	8
Total	23	18

Statistical Caution: As will become apparent, there are a number of numerically quite different comparisons between the various strata discussed below. Some of them suggest interesting patterns. However, the sample is small and variance within subgroups is relatively large. Thus the ability to make statistical confidence statements is constrained. Statistically significant differences have been identified where they occur. In addition, selected other data are presented because it is believed that a larger picture emerges, whether one can prove it statistically or not.

Farm Characteristics

Table 1 presents selected farm characteristics for full- and part-time farmers within each ethnic group.

Table 1. Selected Characteristics of SLVREP Farms

	Hispanic			Anglo			Whole Sample
	FT	PT	Tot	FT	PT	Tot	
Average Age of Farmer	53.5	54.4	53.9	57.2	48.3	55.9	54.9
Acres Farmed	721	287	515	831	275	748	628
Irrigated Acres	421	234	332	468	244	434	382

Farm Size

The most visible differences in Table 1 are found between full- and part-time farmers with respect to both total farm size and the number of irrigated acres per farm. Among Hispanics, both averages differ at the 90 percent significance level. Among Anglo farms the difference between part-time and full-time farms in total area is significant at the 98 percent level while the difference in irrigated acreage is significant only at the 90 percent level.[2]

One might look for differences between Hispanics and Anglos as ethnic groups. However, within the data in Table 1, only small and statistically insignificant differences can be found. If ethnic comparisons are made between only full-time or only part-time farmers, no significant differences are found in farm size or in irrigated acres farmed. Indeed, the similarities between part-time farmers from each ethnic group are especially striking.

The strongest differences occur when the ethnic groups are combined and all full-time farmers compared with all part-time farmers. The former average 788 acres of which 449 (or 57%) acres are irrigated while the latter farm an average of 284 acres of which 236 (83%) are irrigated. Both of these differences are significant at the 99 percent confidence level.

Farm land tends to be more equally distributed among Anglo farmers than among Hispanics. That is, there is less variance in the size of Anglo farms. Reviewing the data reveals that the principal cause is the presence of some very small (15-100 irrigated acres) farms among Hispanics.

The Lorenz curves plotted in Figure 2 indicate a modest but clear Lorenz superiority (more equal distribution) of farm land among Anglo respondents.

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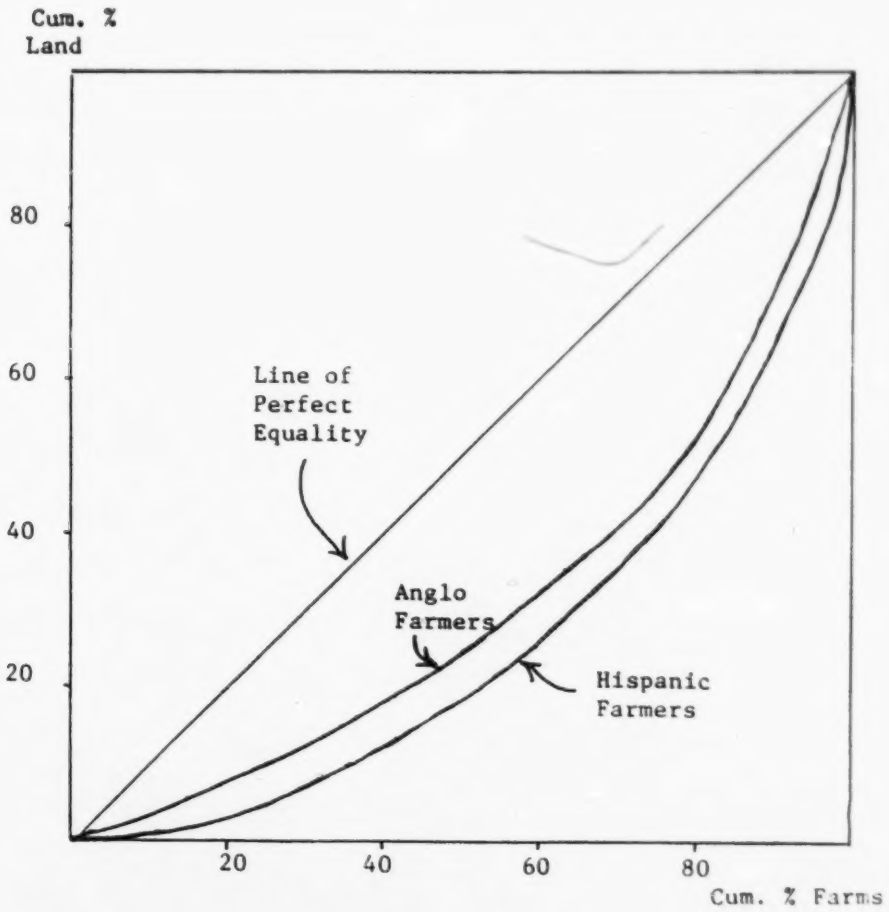
[2]For a layman's discussion of the interpretation of statistical confidence statements, see the Appendix.

Irrigated Acreage

The larger farm group (>340 irrigated acres) averaged 526 irrigated acres with a somewhat larger average (558 acres) for Hispanics and smaller irrigated acreages (507 acres) for Anglos. In the smaller class, Anglo farms averaged 214 irrigated acres while Hispanic farms averaged only 162 irrigated acres. Neither of these differences is statistically significant. Thus, one can conclude that there are no important differences in farm size along strictly ethnic lines in the research area. Only when including the full-time/part-time distinction do significant differences occur.

Figure 2. Lorenz Curves for Land Farmed by Farmers in the SLV REP Area



Age of Farmer

The final observation from Table 1 concerns farmers' ages. Among Anglos, part-time farmers tend to be younger men. Despite the small sample of part-time farmers, this difference is significant at the 90 percent confidence level. Household economics as it has been recently applied to rural farm communities suggests that these younger households may be in the "accumulation phase" of their household life cycle, gradually adding resources until they too become full-time farmers. The high proportion (85%) of full-time farmers within the Anglo stratum reinforces the hypothesis that full-time farming is an accepted life goal towards which Anglo farmers strive.

This age differential is wholly absent among Hispanics. Within this group, whether one is engaged full-time or part-time in farming is apparently not related to age. This suggests that a life cycle pattern of farm resource accumulation is not operating among Hispanics in the research area and that the small to very small farms of the part-time operators result from other, historic, factors.

One interesting distinction between ethnic groups did arise in the relationship between farmers' ages and the size of farm. Among Hispanics, the larger farms are operated by younger farmers while the reverse is true among Anglo farms. Table 2 illustrates these patterns using a three tier classification of farm size.

Table 2. Average Age of Farm Operator Related to Farm Size

	Farm Size[a]			Significance[b]
Ethnic Group	0-250	250-500	>500	(Lg. vs. Sm.)
Hispanic	58.1	53.8	47.7	>90%
Anglo	44.0	55.5	62.7	>90%
Significance[b]	>90%	N.S.	>95%	

[a] Defined as the number of irrigated acres farmed.
[b] Significance of the difference between means, compared vertically or horizontally as shown.

Cropping Patterns

Table 3 presents data on the number of crop enterprises found among respondents. In the research area, irrigated alfalfa constitutes the common denominator--all respondent farmers except one produce the crop. This crop, however, plays a much more dominant role for Hispanic farmers, with individual farms averaging 76 percent of their 1986 irrigated crop area in alfalfa compared with only 51 percent among Anglo farmers (sig. >90%).

Anglo farmers in the project area commonly grow alfalfa plus two other irrigated crops, usually cereals. There were no Anglo farmers who produced only alfalfa. Most Hispanics, by contrast, tend to produce either alfalfa alone or alfalfa plus one other crop. Barley is grown by 85 percent of the Anglo farmers but only 29 percent of Hispanics. Barley, the second most important crop in the project area, is predominantly grown by full-time farmers within both ethnic groups although less than half of the full-time Hispanic farms reported barley acreage. The only wheat and potatoes found among farmers interviewed were grown by Anglo full-time farmers.

Combining full- and part-time farmers yields the following distributions of the number of crop enterprises. These two distributions differ statistically at the 99.9 percent confidence level.

	No. of Crop Enterprises			
	1	2	3	4
Hispanic	8	9	3	1
Anglo	0	5	14	1

The cropping data presented above strongly indicate that the two ethnically defined farm groups differ significantly in the number and type of crops grown. A derivative conclusion is that Hispanic farm incomes are much more narrowly dependent on productivity and prices of a single crop, alfalfa. Agricultural programs designed to enhance the welfare of these farmers must

give priority to alfalfa, or to efforts to draw them into producing alternative crops.

Table 3. Number of Farms With Different Cropping Enterprises, 1986[a]

Enterprise	Hispanic		Anglo	
	Full-time	Part-time	Full-time	Part-time
Number Growing:				
Alfalfa[b]	11	10	16	3
Barley	4	2	16	1
Wheat	0	0	5	0
Potatoes	0	0	4	0
Total Number of Crops per Farm:				
1	3	5	0	0
2	5	4	3	2
3	2	1	13	1
4	1	0	1	0
Alfalfa as % of Cropped Acres[c]	70.8	81.8	51.2	46.6
	76.0		50.5	

[a] Including irrigated pasture, dryland pasture excluded.
[b] All farmers but one full-time Anglo produced alfalfa.
[c] Unweighted averages of percentages calculated for individual farms rather than percent of total area farmed by each group.

Table 4 presents the distribution by crop of total cropped acreage for each group. Table 5 presents the proportional contribution of each farm group to the total acreage grown of each crop. These data reinforce the principal conclusions drawn from Table 3. Alfalfa is the dominant crop in the project area followed by barley in distinct second place. Hispanic farms are heavily dependent on alfalfa, especially the part-time farmers. Despite nearly 1800 fewer irrigated acres in the Hispanic subsample, Hispanics produce more than half the alfalfa in the project area. Barley contributes more than 28 percent of the total irrigated acreage cropped by Anglo respondent farms and less than 14 percent for Hispanic farms. Other crops are of limited consequence on

average, although to individual farmers they may be important. Of these minor crops, Hispanics dominate in the cultivation of native hay and pulses while Anglos are the principal or sole cultivators of potatoes, barley, oats, wheat and irrigated pastures.

Table 4. Percentage of Total Irrigated Area Harvested by Crop, 1986[a]

	Hispanic			Anglo		
Crop	FT	PT	Total	FT	PT	Total
Alfalfa	71.0	81.5	73.9	53.3	49.2	52.9
Native Hay	5.7	0	4.1	0	0	0
Potatoes	0	0	0	5.1	0	4.5
Barley	13.7	14.1	13.8	29.1	22.1	28.4
Oats	1.3	3.5	1.9	2.1	10.0	3.0
Wheat	0	0	0	2.7	0	2.4
Pasture	4.9	0.8	3.8	7.0	18.7	8.3
Pulses	3.4	0	2.5	0.5	0	0.4
Total Acres in sample	3947	1549	5496	6461	801	7262

[a] Columns sum to 100 percent.

Table 5. Distribution of Crop Acreage Among Farm Groups, 1986[a]

	Hispanic			Anglo			Total
Crop	FT	PT	Total	FT	PT	Total	Acres
Alfalfa	35%	16%	51%	44%	5%	49%	7904
Native Hay	100%	-	100%	-	-	-	224
Potatoes	-	-	-	100%	-	100%	330
Barley	19%	8%	27%	67%	6%	73%	2819
Oats	16%	17%	33%	43%	24%	67%	324
Wheat	-	-	-	100%	-	100%	177
Pasture	24%	2%	26%	56%	18%	74%	813
Pulses	81%	-	81%	19%	-	19%	167

[a] Figures in first six columns are percentages of total acres in each crop (Column seven).

Livestock Holdings

Cattle and sheep dominate the livestock enterprises of farmers in the research area. In addition, one respondent listed poultry as a commercial venture, one listed horses and two raised hogs commercially. Several other farms kept a few horses for pleasure or range work and one farm raised a few hogs for home consumption.

Table 6 summarizes data on cattle and sheep held for commercial purposes. Considerable variation was found in herd and flock sizes with the result that most of the comparisons that might be made between data in Table 6 are statistically insignificant, at least based on this small sample. To assess the relative importance of livestock vs cropping among farm enterprises, the number of cattle or sheep per irrigated acre farmed was computed. Higher ratios reflect a greater relative importance given to livestock enterprises.

The most important difference in Table 6 is the fact that, with one exception, Anglo farmers in the project area do not raise sheep. In contrast sheep are found on 12 of 21 Hispanic farms as a commercial enterprise and on two others for home consumption only.

Significant differences are found in these livestock data only between full-time and part-time Anglo farmers with respect to herd size (sig. >99.9%) and cattle per irrigated acre (sig. >99.9%). Apparently those few part-time Anglo farmers enumerated have yet to become significantly involved in livestock husbandry. This conclusion would be consistent with the hypothesis raised above that Anglo farm households follow a conventional life cycle and that these younger households are still building their operations toward viable units.

Table 6. Cattle and Sheep Ownership[a]: SLVREP Area Respondent Farmers, 1986

	Hispanic		Anglo	
	FT	PT	FT	PT
Cattle:				
Number of Herds	9	4	13	2
Percent with Herds	82	40	77	67
Average Herd Size	91	52	160	17
Cattle/Irrig. Acre[b]	.20	.16	.31	.11
Sheep:				
Number of Flocks	6	6	1	0
Percent with Flocks	55	60	5	-
Average Flock Size	488	294	c	-
Sheep/Irrig. Acre[b]	1.33	1.92	c	-

[a] Excluding farmers keeping 1-5 animals for home consumption only.
[b] Average of ratios calculated for each farm with given type of stock.
[c] Data not given to avoid releasing details of an individual farm.

It is common in livestock analyses to estimate total "animal units" by combining species using ratios that reflect approximate nutrition requirements. Conventionally, a mature cow is rated at 1.0 while horses, hogs and sheep are given equivalency ratings of 0.7, 0.4 and 0.2, respectively. Using this method, total "animal units" were estimated for each household owning livestock in the sample. This total was then expressed as the number of animal units per 100 irrigated acres farmed, giving an overall "livestock intensity coefficient". While there is variation between farms, the uniformity of the group average figures obtained by this method is remarkable. With the exception of part-time Anglo farmers, livestock farms in the project area tend to strike a common average of about one animal unit for every three irrigated acres.

	Livestock Intensity Coefficient
FT Hispanics	38
PT Hispanics	31
All Hispanics	35
FT Anglos	28
PT Anglos	11
All Anglos	26
Whole Sample	31

Similar conclusions are reached when farms are grouped by farm size. Very significant differences occur in the number of animals owned between different farm size classes. However, these differences parallel the different farm sizes as defined by number of irrigated acres. With respect to the three ratios (cows per irrigated acre, sheep per irrigated acre and overall livestock intensity) there are no significant differences to be found except that small Anglo farms have lower ratios than any other group (sig. > 95%).

Use of Credit

Respondents were asked whether they had borrowed money in the last five years for each of several separate uses. Table 7 summarizes the results highlighting the three stratifications being used in this analysis.

The general patterns to emerge from Table 7 include the following:

1. There are significant differences in the frequency of use of credit between full-time and part-time Hispanics. The presence of a substantial number of part-time Hispanics, who are relatively inactive in the credit market, also affects the comparisons between all Hispanics and all Anglos.
2. Younger farmers, whether Anglo or Hispanic, tend to borrow more often and for more reasons than do the older farmers.
3. Large Hispanic farms, which are also generally operated by younger full-time farmers, tend to borrow more frequently than do small farms operated by Hispanics.
4. There are few differences between larger and smaller Anglo farms in their use of credit.

Table 7. Use of Credit for Various On-Farm Purposes (% of Respondents[a])

	Type of Use (See Codes[b])							
Hispanic	1	2	3	4	5	6	7	8
Full-time	73	73	36	27	27	18	50	30
Part-time	40	30	30	10	10	0	10	40
Sig. >	80%	90%	NS	NS	NS	NS	90%	NS
≥ 60 yrs.	50	50	0	0	10	0	20	11
< 60 yrs.	64	55	64	36	27	18	40	55
Sig. >	NS	NS	99%	95%	NS	80%	NS	95%
> 340 ac.	78	78	67	44	33	22	63	56
< 340 ac.	42	33	8	0	8	0	8	18
Sig. >	90%	95%	99%	95%	80%	80%	98%	90%
Anglo								
Full-time[c]	82	76	75	24	24	12	29	35
≥ 60 yrs.	75	50	86	0	0	0	0	38
< 60 yrs.	92	100	58	42	42	17	50	33
Sig. >	NS	95%	80%	98%	98%	80%	99%	NS
> 340 ac.	87	73	86	27	27	13	20	40
< 340 ac.	80	100	20	20	20	0	60	20
Sig. >	NS	95%	95%	NS	NS	80%	80%	NS
All Hispanics	57	52	33	19	19	10	30	35
All Anglos	85	80	68	25	25	10	30	35
Sig. >	95%	90%	95%	NS	NS	NS	NS	NS

[a] Percentage of respondents in subgroup who answered "yes" to the question: "Have you borrowed money in the past five years for any of the following purposes?"

[b] Codes for purpose:
1. Farm operating capital (this question was phrased: "Do you borrow regularly for farm operating capital?"
2. Equipment replacement (existing technology)
3. New type of equipment
4. Land purchase
5. Build or repair farm buildings
6. Build, improve or repair the home
7. Land improvements
8. Livestock purchases

[c] Not enough part-time Anglos to develop statistical comparisons

Differences were sought between the full-time Hispanic farms and full-time Anglo farms with respect to credit usage. Except for borrowing to finance a new type of equipment, none were found. In this one instance, however, 75 percent of full-time Anglos reported borrowing to finance a change in technology while only 36 percent of full-time Hispanics did the same (sig. >90%). Similarly significant differences were sought between large Hispanic and large Anglo farms. Only in the case of borrowing for land improvement, which Hispanics did more frequently than Anglos, was there a statistically significant (>90%) difference.

Management Objectives

Information was sought on the objectives of farmers in two different contexts. The first dealt with overall farming objectives while the second dealt with the objectives that underlie daily or seasonal operating decisions. In each case, respondents were asked to indicate the importance of each of a list of objectives as they saw it.

Overall Farming Objectives

This list included: 1) keeping the farm in the family, 2) keeping the farm as a source of retirement income or residence, 3) maximizing present income, 4) supplementing other present income, 5) the farm permits one to live in the area, income is a secondary consideration, and 6) employment opportunities in other occupations are not good. The intent was to assess why individuals farmed, and how this related to broad family goals. Each of the above considerations was ranked in importance on a scale of 1 to 5 with 5 indicating "most important" and 1 labeled "unimportant".

Across the whole sample, keeping the farm in the family ranked highest with an average score of 4.05. In second place (score = 3.78) was the

lifestyle consideration which was stated in the questionnaire as "The farm allows me to live in this area, income is a secondary consideration."

Essentially tied for third were maximizing current income (score = 3.62) and keeping the farm for retirement income or residence (3.54). In last place, below "I have no other employment opportunities" (2.13), was supplementing current income with a raw score of 1.90. This consideration received low rankings in general, particularly so among full-time farmers which composed two-thirds of the total sample.

Full-time vs Part-time: As previously noted, the sample contained too few part-time Anglo farms to test for differences on the full-time/part-time basis within this group. Among Hispanics, the full-time, part-time distinction surfaced some dramatic comparisons as shown in the tabulation below.

	Hispanic Farmers		
	Full-time	Part-time	Sig.
Keep farm in family	4.18	4.20	NS
Retirement income	2.64	4.70	>99%
Maximize present income	4.00	2.90	>90%
Supplement present income	1.55	2.90	>95%
Permits living in area	3.27	4.40	>90%
No other jobs available	2.55	1.10	>90%

Differences in perspective and values show clearly in these data. Both groups value retaining the farm in the family. Full-time farmers, in addition, seek maximum incomes from farming and they value the opportunity to live in the area and to be part of the community. Part-time farmers place their highest value on the farm as a retirement resource. These farmers value their farms presently for supplemental income and because their farm lets them live in the area as part of the local community.

Hispanic vs Anglo: The responses of full-time Hispanic farmers were compared with full-time Anglos. No significant differences were found with

respect to any of the overall farming objectives. Nor were any significant differences found when all Hispanics were combined and compared with all Anglos. The strong conclusion, which comes as no surprise, is that the dominant element affecting overall farming objectives and values is not ethnicity but whether or not a farmer is in agriculture as a full-time job.

Other Stratifications: Disaggregating by farm size or by age of farmer adds further insights. It was observed above that the larger Hispanic farms are operated by the younger farmers on average. Among Hispanics, the goal of maximizing present income was scored higher by large farmers (4.63) than by small farmers (2.77) (sig. >99.9%). Similarly, younger Hispanic farmers gave this goal a score of 4.18 compared to only 2.70 for Hispanic farmers 60 years old or older (sig. >98%).

Diametrically opposite results were obtained for the goal of continuing to live in the area. With this objective the smaller farms, which also are usually part-time farmers, scored 4.31 against 3.00 for larger operators (sig. >90%). Older Hispanics ($\geq$60 years) scored this goal 4.40 vs 3.27 for younger farmers (sig. >90%). This goal ranked highest among all choices for both the older and the smaller farms.

Similar distinctions were not so clearly seen among Anglo farmers. Younger Anglos placed a higher value on keeping the farm in the family than did farmers over 60 (sig. >95%). They also gave a significantly (>90%) higher score to the farm's role as a source of supplemental income. This undoubtedly reflects the fact that younger Anglos are farming smaller acreages on average. Smaller Anglo farms were more committed to keeping their farms in the family (score = 4.80) than were large Anglo farms (score = 3.60, sig. >98%).

Other than these modest differentials, Anglo farmers gave relative uniform scores to the overall farm objectives, suggesting a significant degree of

managerial homogeneity within this ethnic group. No differences were found in their valuation of either income maximization or lifestyle (living in the area) considerations.

Two additional observations are worth noting. First, the importance given to family concerns (e.g., keeping the farm in the family and remaining residents of the area) among overall farm objectives was striking. Conventional farm management and agricultural economics theory concentrates heavily on profit maximization and resource allocation under the assumption that maximizing incomes is the primary, if not the only, goal. In the sample, such an emphasis is only characteristic of the responses of large farmers. Both groups of large farmers ranked income maximization first among overall farm goals. For smaller Hispanic and Anglo farmers, this goal ranked 4th and 3rd respectively, after keeping the farm in the family, living in the area and retirement income. Identical patterns emerge if farms are classified by full- or part-time, i.e., no ethnic differences but full-time farmers rank income maximization first while part-time farmers rank it fourth.

A second observation is a cultural one. Hispanic scores tended to be either higher or lower than the scores given by Anglo respondents. Furthermore, variability was higher within the individual responses given by Hispanics. This suggests that this group tends to be somewhat more intense in their feelings, either positively or negatively, and in the values they associate with farming.

Short-Term Objectives

Respondents were asked to score a second set of objectives which was chosen to reflect daily or seasonal decision making. Table 8 presents selected comparisons of valuation scores.

Farm size emerges as the most important influence on short-term management objectives. Larger farmers tend to be more commercially oriented (objectives 3-5) while smaller farmers, which include several part-time farmers, tend to be more security oriented (objectives 1 and 2).

Table 8. Values Assigned to Short-term Management Objectives[a]

	Management Objective (See Codes[b])							
Hispanic	1	2	3	4	5	6	7	8
All	4.4	4.0	3.4	4.1	3.9	3.6	2.3	3.4
> 340 ac.	3.7	3.3	4.7	4.6	4.0	2.7	3.1	3.1
≤ 340 ac.	4.7	4.5	2.7	3.8	3.8	4.0	1.8	3.5
Sig. >	80%	90%	99%	80%	NS	90%	98%	NS
≥ 60 yrs.	4.6	4.6	2.7	3.8	4.2	4.2	1.7	3.5
< 60 yrs.	4.1	3.5	4.1	4.4	3.6	2.9	2.9	3.3
Sig. >	NS	98%	90%	NS	NS	98%	99%	NS
Anglo								
All	3.7	3.5	3.7	3.6	3.8	3.5	2.6	3.2
> 400 ac.	3.3	3.1	3.8	1.2	1.0	4.4	2.5	4.0
≤ 400 ac.	4.1	3.9	3.6	3.2	3.6	3.0	2.6	2.6
Sig. >	90%	80%	NS	90%	NS	99%	NS	99.9%
Whole Sample								
> 400 ac.	3.5	3.2	4.3	4.4	4.0	3.4	2.8	3.5
≤ 400 ac.	4.5	4.2	3.0	3.6	3.7	3.6	2.1	3.1
Sig. >	95%	98%	99%	95%	NS	NS	90%	NS

[a] Levels of importance ranging from 1-unimportant to 5 = most important.

[b]
1. Avoiding mortgaging my land.
2. Avoiding being in debt in general.
3. Maximizing my income.
4. Maximizing my yield per acre.
5. Minimizing my cash costs.
6. Being able to trade with people I trust.
7. Minimizing the amount of my time required.
8. Having a stable income source.

Generalized Patterns

As noted at the outset, this research sought to isolate a few unique farm types which could then become target groups for specially designed technologies or policies that would match the characteristics of the individual groupings. The analysis, however, revealed a complex pattern of associations. No one or even two stratifications proved to be best for defining clearly distinct farm groups. Instead, several different stratification criteria each proved to be useful for explaining different farm parameters.

The main conclusions from this study can be summarized as follows:

1. Hispanic and Anglo farms do not differ significantly in either total farm size or number of irrigated acres when analyzed on strictly ethnic lines. Highly significant farm size differentials do exist, however, between full-time and part-time farmers within each ethnic group and within the whole sample combined.
2. The composition of each ethnic subgroup varies significantly with respect to the full-time/part-time criterion. Fourty-eight percent of Hispanics were part-time farmers compared to only 15 percent of the Anglo subgroup.
3. Farm size is closely related to two other general farm characteristics:
   a. Larger farms (> 340 irrigated acres) tend to be full-time farmers, and conversely.
   b. Larger farms tend to be operated by the younger farmers if they are Hispanic farms and by the older farmers if they are Anglo farms.
4. Nearly everyone in the research area (98% of the sample) grows alfalfa. Thus this crop could be considered the common denominator

or the "economic safety net" under SLV agriculture. Hispanic farms devote 70-80 percent of their irrigated land to alfalfa. Their farm incomes are thus particularly dependent on this one crop.

5. Hispanic farms grow fewer crop species than do Anglos. As a generalization, Anglo farmers normally cultivate alfalfa plus two other crops while Hispanics grow alfalfa alone or alfalfa plus one other crops.

6. Eighty-three percent of all farms in the sample raise livestock as a commercial enterprise. Anglo farmers concentrate almost exclusively on cattle. Hispanics fall into four categories; cattle only (24% of Hispanics), sheep only (24%), cattle and sheep (33%) and neither sheep nor cattle (19%). Part-time, Anglo farmers are much less involved in livestock husbandry than any other group. All other groups average between 30-35 animal units per hundred irrigated acres.

7. The propensity to borrow money is related to two factors; the farmer's age and whether he is a full-time or part-time farmer.
   a. Younger farmers tend to borrow more often and for more purposes than do older farmers.
   b. Part-time farmers borrow money much less often than full-time operators.

8. Among overall farming goals, family and life style considerations ranked highest when all responses were pooled. The two relevant objectives were "keeping the farm in the family" and "being able to live in the area, income being a secondary consideration".

9. Full-time/part-time considerations were the dominant factor affecting farming goals. Full-time farmers ranked income maximization

significantly higher than did part-time farmers. On the other hand, part-time farmers listed retirement or supplemental income, and being able to live in the area as their dominant farm goals.

10. Farm size emerged as the most important influence on short-term management objectives. Larger farms tended to be managed along a commercial orientation (maximize income or yield, minimize cost) while small farms adhered to risk averse criteria (avoiding land mortgage or debt in general) and a social criterion ("being able to deal with people I trust").

Implications for Agricultural Programs

The original purpose of this paper was to draw guidance from these data for the design and implementation of agricultural research and extension programs. In doing so, the reader is cautioned that the area studied was limited to farms irrigated from the Alamosa River and La Jara Creek. Consequently, the farms studied are restricted to the southwest corner of the San Luis Valley, wholly in Conejos county. Technical conclusions may not be widely applicable to other areas in Colorado, although there are several counties with similar farm profiles where some of these conclusions might fit.

Ethnicity did not prove to be as strong of an indicator as was originally believed. With most of the survey responses, there were only modest differences between Hispanic and Anglo farmers if there were any at all. The few important differences that did arise occurred in cropping patterns and livestock holdings.

From a policy perspective, these differences result in the following considerations. First, if improved farm income among Hispanic farmers is an accepted goal, production and marketing programs focused on alfalfa can

potentially affect every Hispanic household. Anglo farmers will benefit as well but to a lesser extent due to their proportionally lower dependence on this one crop.

Second, Hispanic farmers have the potential, at least at first glance, of expanding their income sources by adding additional high value crops such as potatoes and barley. Perhaps the reason they don't do so is given in Table 7. Data in that table indicate that Anglos are more than twice as active borrowing money for "new types of equipment". The implication is that Hispanics may hesitate to use the credit market for the rather substantial investments in new technology needed to add a new crop.

In the area of livestock, cattle improvement programs will benefit both ethnic groups, although the primary beneficiaries will be Anglo farmers. If research or extension benefits are distributed according to the distribution of animals, Anglos owned 65 percent of the cattle identified in the survey. For similar reasons, a sheep improvement program will benefit primarily Hispanic farms on which 99 percent of all sheep are found.

Beyond these few ethnic differences, the main distinctions were found between farm size groups or between full-time and part-time farmers. These two stratification variables are included in Table 9, to explore the resulting farm groups as potential targets for agricultural policy, research and extension.

Large, full-time farms dominate agricultural production in the sample area. Although they constitute only half of the number of farms, they cultivate approximately 70 percent of the irrigated land, 70 percent of the alfalfa and barley and raise more than 85 percent of the cattle. If society's objective for this region is only to maximize agricultural output, this is the group toward which technology development should be targeted.

Table 9. Farm Groupings in the SLVREP Project Area Classified by Size[a] and Full- or Part-time Status

Item	(Unit)	Full-time		Part-time	
		Large	Small	Large	Small
Farms sampled	(#)	21	7	3	10
	(%)[b]	51.2	17.1	7.3	24.4
Hispanic/Anglo	(#)	7/14	4/3	2/1	8/2
Area farmed	(ac)	19,311	2,751	1,991	1,705
	(%)[b]	75.0	10.7	7.7	6.6
Irrigated area	(ac)	11,020	1,557	1,615	1,454
	(avg)	525	222	583	145
	(%)[b]	70.4	10.0	10.3	9.3
Irrigated percent	(%)[c]	57.1	56.6	81.1	85.3
Alfalfa	(ac)	5,478	769	961	696
	(%)[b]	69.3	9.7	12.2	8.8
Barley	(ac)	1,920	503	286	110
	(%)[b]	68.1	17.8	10.1	3.9
Crop species	(#)	2.7	2.1	2.0	1.7
Cattle	(herds)	17	5	1	5
	(#)	2,628	155	105	137
	(%)[b]	86.9	5.1	3.5	4.5
Sheep	(flocks)	3	4	2	4
	(#)	1,950	810	1,530	236
	(%)[b]	43.1	17.9	33.8	5.2
Percent of group borrowing for:					
Operating capital	(%)[d]	85.7	57.1	66.7	50.0
Equipment replacement	(%)[d]	71.4	85.7	100.0	30.0
New technology	(%)[d]	75.0	14.3	100.0	10.0
Land purchase	(%)[d]	28.6	14.3	22.2	0.0

[a] Large farms > 340 irrigated acres.
[b] Percentage of total in sample.
[c] Percentages for this item are irrigated acres farmed expressed as percent of total area farmed.
[d] Percentages for these items are percent of farmers within each group.

The question of the distribution of benefits, however, is also a valid policy concern for society. Table 9 can also be interpreted as follows:

a. Half of the farms in the area are NOT large, full-time farms and yet these farmers are also dependent, either wholly or partially, on agriculture for income, food and their roles in the community.

b. Two-thirds of the beneficiaries of programs targeted solely at large, full-time farms will be Anglo farmers.

c. Two-thirds of the Hispanic farm population is NOT in the large, full-time category.

Certainly these social observations require that agricultural improvement on smaller and/or part-time farms must receive significant attention. As has been noted above, the one enterprise that impacts all farmers in the area is irrigated alfalfa. Given the cropping patterns shown in Table 3 and 4, improvement in the efficiency or profitability of alfalfa production will be especially meaningful for Hispanic and part-time farmers.

The number of crop species grown, a measure of the diversity and perhaps profitability and stability of farm incomes, shows a distinct pattern across the farm types in Table 9. This suggests that additional enterprises can offer new opportunities to the resource restricted farm if problems of attitude, risk and lack of experience can be solved.

References

Hatami, Bahman, Rhonda Skaggs, Susan Smolink, Maya Ter Kuile, and Pat Wilkens-Wells, 1984. "Report on Farmer Interviews," unpublished project working paper, Colorado State University, Ft. Collins.

Rauch, Eugene H., 1979. Factors Affecting Small Farm Income: A Study in the San Luis Valley of Colorado, Master's degree thesis, Department of Economics, Colorado State University, Fort Collins.

Skaggs, Rhonda K., 1985. Enterprise Costs and Returns and Profitability Analysis for the Southern San Luis Valley. Masters degree thesis, Department of Agricultural and Natural Resource Economics, Colorado State University, Fort Collins.

Appendix A

Interpreting Statistical Confidence Statements

Statistics provide the means for accepting or rejecting hypotheses and for estimating the probability of being right or wrong when making such a decision. Tests of this nature are based on probability theory which relies on known and estimated characteristics of selected distributions.

The analyst makes an assumption (asserts a hypothesis), usually in the form of "The average of a characteristic from Sample A differs from that obtained from Sample B". The alternative (the "null hypothesis") is the assumption that there is no difference between the two samples with respect to the characteristic in question. Statistics then provide the basis for calculating the probability of being right or wrong if one accepts one or the other of these two hypotheses. This is commonly called the statistical confidence test or simply the significance of the difference.

As an example (drawn from page 7), we assert (H_1) that the average farm size of full-time Hispanic farmers differs from that of part-time Hispanic farms. The null hypothesis (H_o) is that there is no difference.

H_1 = Average full-time Hispanic farm size $\neq$ Average part-time Hispanic farm size

H_o = Average full-time Hispanic farm size = Average part-time Hispanic farm size

Based on the two measured averages, their variances and the size of the two samples, a statistic is calculated which can be compared with existing tables that relate values of the chosen statistic with selected levels of probability. In the present example the statistic exceeds that required at the 90 percent confidence level but not that for the 95 percent level. Therefore, if one wishes to state that full-time and part-time Hispanic farms are

characterized by different average sizes, he has better than a 90 percent chance of being correct (based on this sample) b t not a 95 percent chance. In the text, this result is listed as: (sig. >90%).

The reader is cautioned that a 90 percent chance of being right also means a 10 percent chance of being wrong. Most experimental research under controlled conditions requires confidence statements of either 95 or 99 percent, which are customarily called "significant" and "highly significant", respectively. In the case of survey research, it is acceptable to reach conclusions based on 90 percent confidence levels. In this study 80 percent confidence levels are also noted, not to make strong conclusions, but to indicate relationships that are approaching the level of difference at which stronger statements could be made. It is possible that a larger sample would have resulted in stronger confidence tests. But from this sample, confidence tests between 80 and 90 percent can be taken only as possibly indicative. Results below the 80 percent level are dismissed as insignificant.